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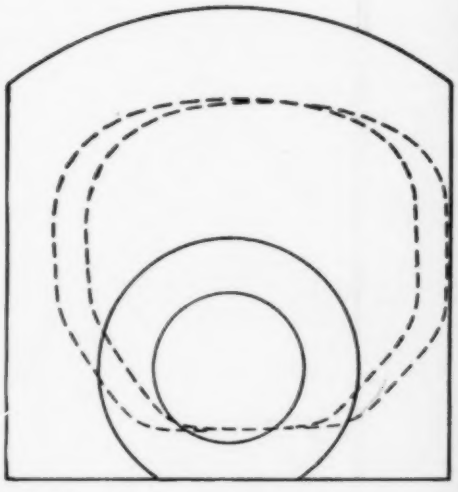

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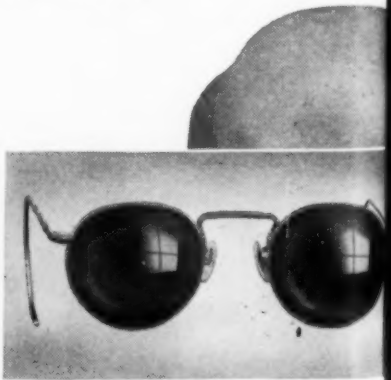

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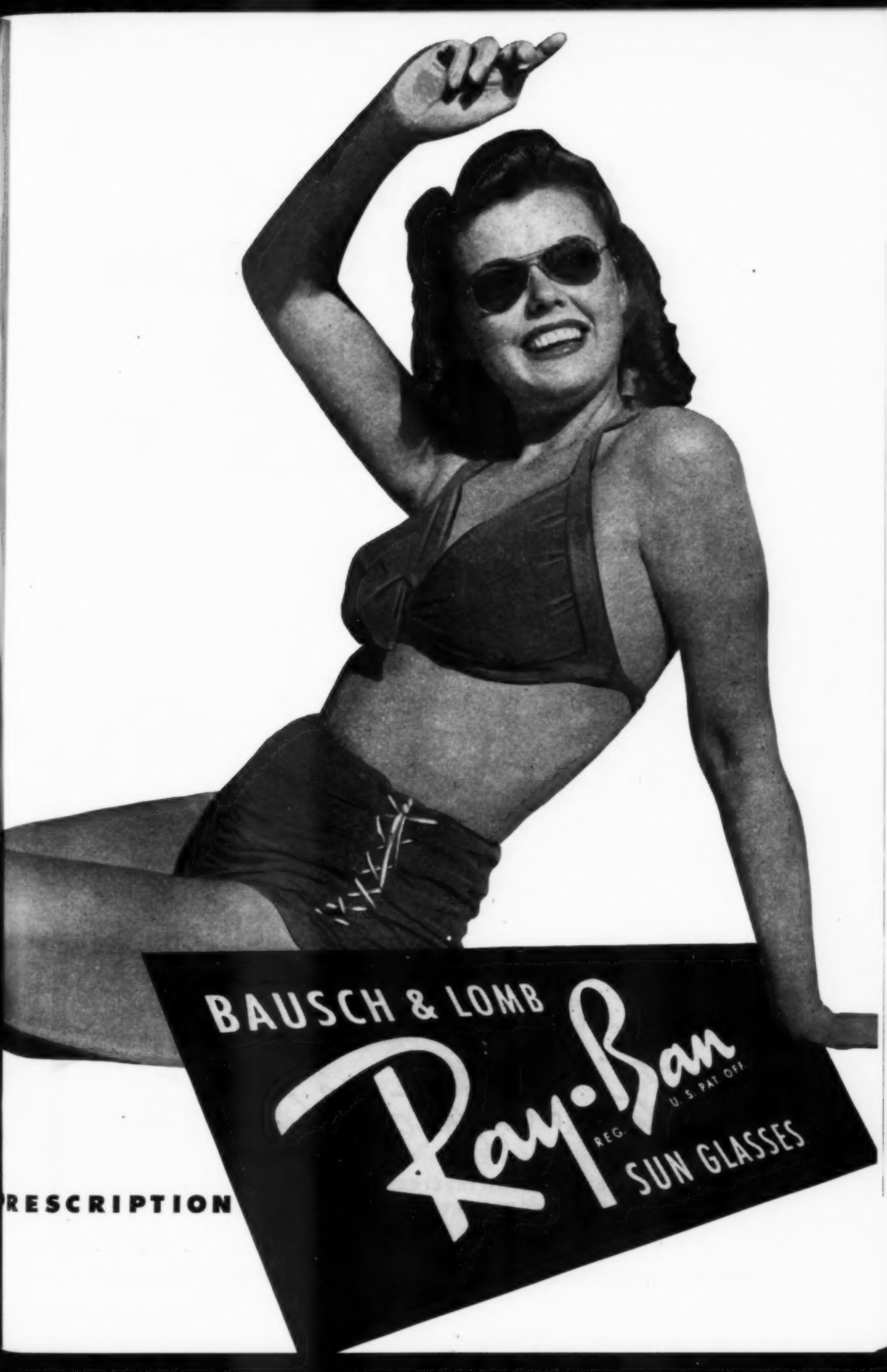

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By: ROY MARKS,
Vice President in Charge of Sales
The Univis Lens Company, Dayton, Ohio

Reprinted from the Univis Bulletin, June, 1947

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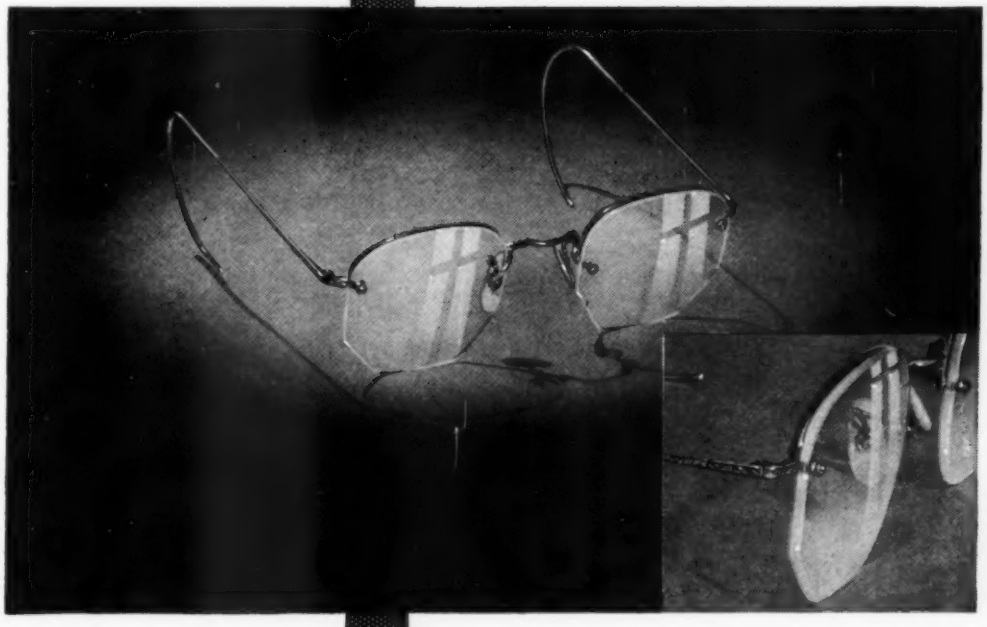

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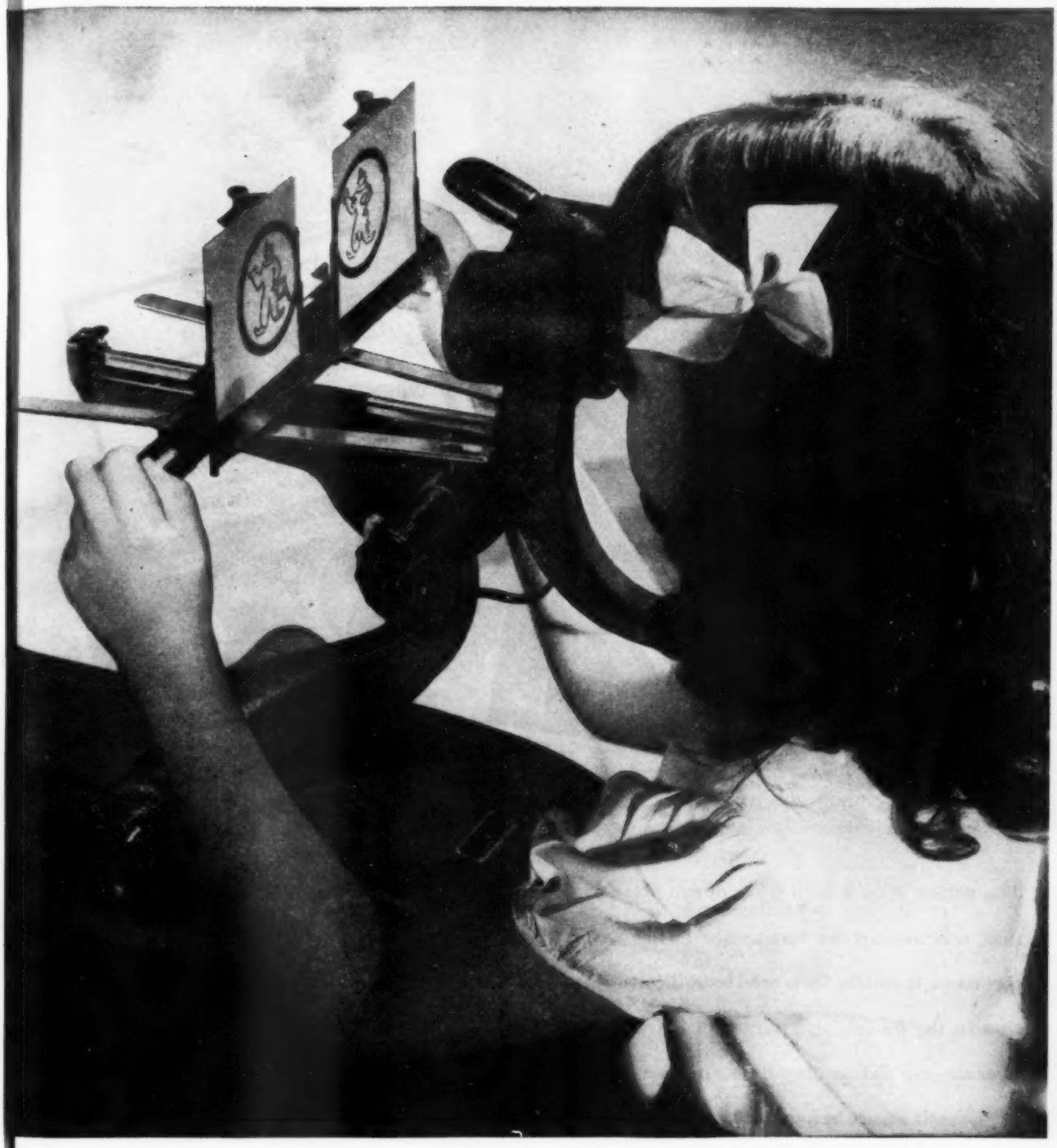

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Vol. 24 JULY, 1947 No. 7

MYOPIA — THE PRESENT STATUS*

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School of Optometry, University of California
Berkeley, California

Ever since Kepler in 1611 pointed out the basic refractive conditions underlying myopia, interest in this ametropia has had its periods of great enhancement. During the recent war years we have experienced one of these periods, due to the emphasis on vision in the armed services as a criterion for selecting officer material. Directly or indirectly as a result of this there have appeared a number of papers dealing with researches on the various ametropias. Of these, perhaps the majority have been concerned with the myopic refractive state, as this ametropia interferes most severely with acute distance vision. It seems appropriate, therefore, to examine the present status of myopia in light of this material.

Until rather recently emmetropia was considered the only physiologically normal refractive state and all departures from emmetropia were considered to be caused by some agency interfering with normal ocular physiology. Hypermetropia was thought to result from an interference with normal ocular development, but except for the high degrees of hypermetropia, since compensation can be obtained by accommodation, relatively little interest was shown for this refractive state. Myopia, however, was a source of much greater concern due mainly to its attendant poor distance vision, its tendency to increase, and the degenerative retinal changes occasionally associated with it.

In considering all types of myopia it appears that most true myopia is relatively uncomplicated and seems to be simply a refractive state in which the secondary principal focus of the eye lies anterior to the retina.

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†Optometrist. Fellow, American Academy of Optometry. Dean, School of Optometry, University of California.

These eyes in general show no progression after the adolescent years and no degenerative fundus changes. There is a smaller class of myopic eyes that show degenerative fundus changes usually in early middle life. These changes usually take the form of posterior staphyloma, retinal detachment, hemorrhages or transudates. Some, but not all, of these latter eyes may show rapid increase in myopia. Myopia of this type may reasonably be classified as pathological and is excluded from the discussions that are to follow.

The early observations of Ritterich[1] and Arlt[2] on excised myopic eyes had shown marked scleral distortion with axial elongation in high myopia. These researches led to the teaching that all myopia was due to an eyeball too long for the refractive media present. While this impression was somewhat modified by the discovery of Schnabel and Herrnheiser[3] that some excised myopic eyes showed antero-posterior dimensions comparable to emmetropic eyes, which led to the postulation of index or refractive myopia, the feeling still remained that most all myopia of significance was axial in nature. The conviction that something abnormal caused this increased length persisted, and most of the studies on myopia in the last hundred years have been concerned with possible causative agents. These postulated causative agents have fallen mainly into the following categories:

(1) Excessive near use of the eyes.
(2) Endocrine dysfunction.
(3) Poor nutrition.
(4) Poor school hygiene.
(5) Heredity.

While it is not the purpose of this paper to discuss exhaustively the historical literature on myopia, some reference must be made to this literature in a general way.

Perhaps even today implicit in the thinking of most clinicians on myopia is the conscious or unconscious feeling that something in the act of seeing, particularly for near use of the eyes, causes structural change in the eyes of some patients tending to form myopia from emmetropia, or causing a progressive increase in the myopia already present. Certainly statements to this effect appear in most text books which deal with ametropia. This is a very ancient concept which has gained respectability by repetition by almost all the authorities in this field.

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1. Ritterich-Schmidt's Jahrbuch—36, 138, 1842.
2. Arlt—Krankheiten des Auges—3, 238, 1854.
3. Schnabel and Herrnheiser-Zeits. f. Heilkunde—16, 1, 1895.

A brief outline of several theories of the formation of myopia in this category may be instructive. One of these states that excessive convergence introduces scleral stresses through continued contraction of the internal recti muscles causing stretch in the sclera, a longer eyeball, and hence myopia. Another theory postulates increased intraocular pressure under the action of continued accommodation, resulting in scleral stretch and therefore myopia. Variations and combinations of these ideas together with postulated tissue weaknesses have formed the basis of other theories. Therapy for myopia prevention based on these theories has been directed toward decreasing the accommodative and convergence effort. Thus the prescribing of base-in prisms and the under correction of myopia together with restriction of near use of the eyes has formed the backbone of clinical treatment. While many partisan reports have appeared in the literature, a truly statistical evaluation of the merits of this treatment is still awaited. As nearly as the unbiased investigator can determine on the basis of the available information, it would appear that such treatment has little influence upon the formation or progression of myopia.

An elaboration of this near-use theory was developed by Cohn[4] in 1887. In this theory, Cohn laid emphasis on the fact that myopia appears and progresses most rapidly during the adolescent school years. As a result, much concern was expressed over the conditions under which students used their eyes during school hours. It must be admitted that in those days school hygiene was hardly ideal. In the years that followed, lighting conditions, habits of study, readability of type, and allied factors were improved markedly. Recently, Sorsby[5] has reviewed the literature on the incidence in myopia in the various European countries since these changes in school hygiene have taken place, and states that the evidence does not warrant the conclusion that it has had any material effect upon myopia.

In light of these conclusions the fact that a larger proportion of the population does not develop myopia under identical conditions of seeing becomes significant. The proponents of near use of the eyes as a cause of myopia in order to explain this fact usually inveigh the principle of "constitutional weakness or predisposition." It becomes apparent, therefore, that the cause of myopia must be projected to the underlying constitutional weakness. The latter postulated condition has been

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4. Cohn-Internat. hyg. Kongr. zu Wien—1887. Breslauer ärztl. Zeitschr.—No. 10, 1889. Zeitschr. f. Schulgesundheitsfl. No. 1 and 2, 1890.
5. Sorsby—Trans. Ophth. Soc. U. K.—57, 379, 1938.

assigned, among other factors, to faulty nutrition, endocrine dysfunction, and heredity. Of these, heredity is most often indicted as it is quite apparent that heredity plays an important part in myopia. As to whether heredity causes a weakened sclera is less clear. In this connection one theory in vogue states that faulty calcium metabolism associated with hypoparathyroidism leads to scleral weakness so that myopia is formed by the action of normal intraocular pressure upon a weakened sclera. Attempts to correct clinically such a theoretical deficiency by calcium, vitamin D, and parathyroid have led to conflicting reports. This fact, together with the report that most myopic patients have a normal blood calcium, have tended to undermine the theory.

Some clinicians have observed that many myopic patients have had a low basal metabolic rate. This has led to the prescribing of thyroid in the effort to prevent the progression of myopia on the assumption that hypothyroidism may be a causative factor. As far as the writer knows, no statistical report has appeared in support of this concept.

Other endocrine glands have been indicted in theories of myopia formation and appropriate treatment undertaken. The results of such treatment on any large scale, or by several investigators, have yet to be reported and therefore final conclusions must be deferred. It must be admitted, however, that considering the profound influence the endocrine glands have on all body growth, it would be foolish to deny, at this stage of our knowledge, the possibility that endocrine dysfunction might be at least a contributing factor in the formation of myopia.

A number of papers have appeared apparently showing a greater incidence of myopia in underprivileged groups implying that myopia results, at least in part, upon faulty nutrition. This is an attractive theory and it seems reasonable to expect that faulty nutrition would influence body growth and hence possibly ocular growth. The papers on this subject, however, are by no means in complete agreement and so the question is still unsettled. In any event, while the effect of nutrition may be contributory, it probably cannot be considered a main causative factor in myopia.

Thus, in partial summary, the effect of near use of the eyes, hygiene, nutrition, and endocrine dysfunction would appear to have no direct major effect on the formation or progression of myopia. It should not be inferred, however, that strongly partisan papers urging one or another of these theories have not appeared. As is true of most biological phenomena, many factors probably enter into the development of myopia and it is difficult, if not impossible, to keep all these factors except the

one under investigation constant. As a result, such phenomena are usually examined by the method of statistical correlation. Even this method has not been used in most of the investigations on myopia, and in practically none have proper controls been used. Hence, while not denying the possibility that at some future time some of the above-named factors may be proven offenders in myopia, the present position would seem to be that they are minor factors if indeed they are factors at all.

At birth practically everyone is hypermetropic and the few researches that have been concerned with this problem indicate that the median refractive state is of the order of three diopters of hypermetropia. The eye at birth is small with an antero-posterior dimension approximately 7mm. less than that of adult emmetropic eye. Obviously the eye during development must, therefore, undergo rather profound changes irrespective of the final refractive state. Of the various factors that are involved in the determination of the refractive state of the eye, the following four predominate:

(1) Refractive power of cornea.
(2) Refractive power of lens.
(3) Depth of the anterior chamber.
(4) Axial length of the eye.

In the growth process, all of these factors undergo considerable change and the surprising thing is that they combine so frequently in the optimum optical relationship that is referred to as emmetropia. Consideration of the biological variation in the above four factors led Steiger[6] in 1913 to suggest that all ametropia may result from uncorrelated biological variation in these several components. On this basis, since variation can occur in either a positive or negative sense relative to an average, myopia and hypermetropia occur simply as a growth variants analogous to those in other anatomic structures. Steiger plotted a frequency distribution for the refractive state of a large number of eyes that gave essentially a normal distribution curve but which was more peaked near emmetropia. He interpreted this as indicating a slight correlation between the various elements effecting the refractive state instead of an unrelated variation for each of the elements. Steiger, however, had no distribution measurements for either the axial length or the lens power and so his conclusions were tentative. However, this point of view constituted a complete departure from the ideas that had dominated thinking on ametropia for many years. While this view that

6. Steiger—Zeits. f. Augenheilk.—20. 97, 1908. Die Entstehung der sphärischen Refractionen des menschlichen Auges. Berlin 1913.

ametropia occurs simply as a biological variation was attractive, it remained only a theory until precise measurements of axial length and lens power were possible in the living eye.

In recent years, Tron[7], in addition to measuring the corneal power, and depth of the anterior chamber by using the Purkinje images, attempted to measure the power of the lens in the living eye. From these measurements he calculated the axial length, knowing the total power from clinical refraction measurements. These calculations were exceedingly laborious and subject to considerable error. Nevertheless the results tended to substantiate Steiger's original hypothesis.

It remained for Rushton[8] to develop a method of precise determination of the antero-posterior length in the living eye. This method makes use of the fact that the dark-adapted eye is sensitive to x-radiation. Rushton projected a narrow beam of x-rays perpendicular to the visual axis of the observer's eye. This gave rise to the perception of a circle of light where the beam of x-rays intersected the retina, co-axial with the visual axis. As the x-ray beam was moved toward the posterior pole of the eye, the circle of light was reduced in size until at the fovea the circle became a point of light. This determined the position of the fovea to within 0.01mm. The position of the anterior pole of the cornea was determined by direct optical observation. Thus for the first time it was possible to determine the length of the living eye.

Making use of this method, Goldmann and Hagen,[9] and Sorsby and O'Connor[10] measured a few eyes both as to component refractive power and axial length. The number of eyes measured was too small to give any statistical data on ametropic eyes, although it was shown that in emmetropia there appears to be a considerable variation in axial length.

Quite recently the most complete, quantitative study of the various factors in ametropia has appeared. Stenstrom,[11] using Rushton's method, has measured the axial length of the eyes on 1,000 unselected cases (315 women and 685 men) between 20 and 35 years of age. In addition, he measured the corneal power, the depth of the anterior chamber,

7. Tron—Arch. f. Ophth.—122, 1, 1929; Arch. f. Ophth.—124, 544, 1930; Arch. f. Ophth.—126, 454, 1931; Arch. f. Ophth.—132, 182, 1934; Zit. Zentralbl f. d. ges. Ophth.—45, 340, 1940.

8. Rushton—Trans. Ophth. Soc. U. K.—58, 136, 1938.

9. Goldmann and Hagen—Ophtalmologica—104, 15, 1942.

10. Sorsby and O'Connor—Nature—156, 779, 1945.

11. Stenström—Untersuchungen über die Variation und Kovariation der optischen Elemente des menschlichen Auges—Uppsala 1946. (A complete summary of this paper will appear in "Modern Trends in Ophthalmology" by Arnold Sorsby to be published during 1947.)

the total refractive power, and from these values calculated the lens power. The data have had a complete and careful statistical treatment and as a result, definite conclusions could be made with confidence about the biological variation in the various elements that effect the refractive state of the eye. A partial summary of these results follows:

	Average	*Range*	*Std. Deviation*
Corneal Power (D_1)	42.84 D	38.5 D-47.0 D	1.401 D
Anterior Chamber Depth (d)	3.68 mm	2.80 mm-4.55 mm	0.287 mm
Axial Length (b)	24.00 mm	20.00 mm-29.5 mm	1.09 mm
Lens Power (D_2)	17.35 mm	12.5 D-22.0 D	1.480 D
Total Power (D)	58.13 D	52.5 D-63.5 D	1.78 D
Refractive Power (A)	+0.12 D	+10.00 D to —13.00 D	2.20 D

Each of the above factors has been shown to have an approximate normal statistical distribution. The axial length, however, shows some skewness toward longer axial lengths. The correlation coefficients between each pair of factors have been calculated and the pertinent ones listed below:

CORRELATION COEFFICIENTS

	D_1	d	D_2	b	D
A	—0.18	—0.34	0.00	—0.76	—0.10

In brief explanation of these coefficients it may be said that a coefficient of 1.0 represents an exact co-variation between two elements, while a coefficient of 0 indicates complete independence. A negative coefficient indicates an opposite co-variation.

From these data it is seen that there is only a minor correlation between the refractive state and the other factors with the exception of the axial length. The coefficient of —0.76 between these two elements represents a strong correlation. Thus the concept of the length of the eyeball being the most important factor in the formation of ametropia has been confirmed by quantitative measurements on the living eye. Therefore, it would appear that most myopia is axial in nature and so-called index myopia constitutes a minor category. This point is borne out by the low correlation between the refractive and the total power.

As a result of the statistical distribution of all the factors involved in the total refractive state, together with the minor correlation between these factors, the concept that ametropia results from biological variation in these elements would appear to receive strong substantiation. In concluding this brief summary of Stenstrom's work it should be emphasized that both the measurements and calculations have had critical treat-

ment. This research has been a tremendous contribution to our knowledge of the refractive components of the eye, and constitutes the greatest step forward in this field since the days of von Helmholtz and Gullstrand.

If the conclusion that most ametropia occurs as a result of chance grouping of several factors exhibiting essentially normal biological variation, the whole clinical attitude toward ametropia must be revised. In particular it would seem that current clinical efforts toward modifying either the formation or progression of myopia are probably useless. This may be the reason for the inability to demonstrate clearly any favorable influence on myopia by the various methods previously mentioned.

Within recent years it has been contended that the myopic refractive state can be modified by orthoptic methods. As far as the writer is aware, no report actually demonstrating a reduction in true myopia has appeared in the literature. It has, however, been demonstrated[12, 13, 14] that for a given degree of myopia the visual acuity could be improved on an average of one to two lines on the Snellen Chart. This is, of course, a significant fact but it has little bearing on either the formation or progression of myopia.

In summary, it appears that the myopic refractive states, as well as the other refractive states, result from the chance combination of various refractive elements, each of which apparently exhibits a normal statistical distribution. Since these distributions are probably associated with individual growth and development characteristics of the eye, factors which influence such growth, as for example endocrine dysfunction, nutrition, and heredity, may be involved in determining the ultimate refractive state of the individual. At the present time, however, it has not been clearly demonstrated on a statistical basis that any of the factors usually thought to contribute to the formation or progression of myopia are in fact so involved. The clinical practices currently in vogue regarding myopia should be reviewed with these facts in mind.

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12. Woods—Am. Jour. Ophth.—29, 28, 1946.
13. Ewalt—Jour. Am. Optom. Assn.—17, 167, 1946.
14. Hackmann—Jour. Am. Optom. Assn.—18, 416, 1947.

TRIFOCALS TO MEET OCCUPATIONAL VISUAL DEMANDS —A CASE REPORT*

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I CASE HISTORY

OCULAR HISTORY

The patient, I. P. L., presented himself for visual examination on December 11, 1946. The patient is 60 years of age and has worn his present correction for five years. This correction is O.D. +0.50 ⊂ +0.50 axis 180, O.S. +1.00 Sphere, add O.U. +2.00 D. bifocal. Visual acuity at six meters with this correction is O.D. 20/33, O.S. 20/30, O.U. 20/30.

Prior to this correction the patient reports he had usually had a refractive examination every 18 months. He has worn glasses for over 20 years.

When questioned further as to ocular history, the patient mentioned having boxed while a student in college. He reports that during this time he received a severe blow in the left eye and a vague recollection of difficulty with the eye for some time thereafter. This is the only ocular injury the patient recalls and reports having had no ocular condition which required medical treatment.

HEALTH HISTORY

The patient is a very active person and until a few years ago had been in excellent physical condition. He states that his general health for three or four years has been very poor due to roentgen ray burns sustained in his practice during the experimental phase of this work. This condition has been most severe in the tissues of his hands and fingers but has resulted in a general feeling of ill health which has been intermittently increased by the necessity for surgical intervention and consequent removal of portions of and lately entire fingers.

The patient reports that all of his teeth were removed over 10 years ago. He uses full upper and lower dentures.

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He says that at this time he is in comparatively good health. His psychological attitude is very pleasant and aggressive.

FAMILY HISTORY

The familial history of the patient is negative insofar as ocular conditions are concerned. His father died at the age of 86 and the patient recalls that the only ocular difficulties were senile changes but no pathological condition. The patient's mother died somewhat younger but had no ocular anomalies. The patient knows of no serious ocular trouble in his family. The patient is an only child.

SCHOOL HISTORY

The patient is a practicing physician having graduated from the School of Medicine, University of Pennsylvania, in 1909. He recalls no difficulty in reading or studying while in school.

OCCUPATION

The patient is by occupation a physician. He has for many years limited his practice to radiology. His office is very large. In addition to the usual medical office equipment the patient states that he uses a fluoroscope, a diagnostic x-ray outfit and a deep therapy unit. He has his own photographic laboratory. He is also director of a general medical laboratory. The fluoroscopy and x-ray work are done at 30 inches. The general medical and administrative work are done at normal near working distances.

SOCIAL AND RECREATIONAL HISTORY

The patient describes himself as voluntarily socially inactive at present. His hobby is stamp collecting and he spends a great deal of time at this. He attends an occasional movie.

COMPLAINT

The patient's complaint is: "When examining a patient with the fluoroscope, I find that I must either get up very close to him and hold my head back to look through the bottom of my glasses or back away to look through the top portion of the lens. As a result, my neck is very tired at the end of the day. I am having trouble working with my stamps after a full day at the office."

SUMMARY

This patient is a physician who has limited his practice to radiology. The patient presented himself for visual examination because of ocular fatigue symptoms and occupational visual handicaps. Routine

examination indicated change of correction. Occupational visual demands indicated trifocals. Patient reports relief from the symptoms and valuable assistance in his occupation.

II PRELIMINARY FINDINGS

External examination of the patient shows a looseness of the lids due to senile degeneration of the tissues. The margins of the lids are healthy and the puncta clear. Eversion of the lids shows the tarsal conjunctiva to be clear. The bulbar conjunctiva is not injected but shows a yellowish discoloration. The condition of arcus senilis exists in both eyes.

The iris in both eyes shows normal pigmentation and an even surface appearance. The pupils are small but show normal reaction to light both directly and consensually. There is no obvious anomaly of convergence and of the associated pupillary reaction.

The patient has no difficulty in rotating the eyes in all directions, monocularly or binocularly, when asked to follow a target.

The cover test shows no evidence of high phoria at distance. The confrontation test shows no apparent limitation of field. The palpation test is negative.

III OPHTHALMOSCOPIC AND OTHER TESTS FOR PATHOLOGY

THE RIGHT EYE

Ophthalmoscopic examination of the right eye shows the cornea to be clear of any opacities or inflammation. The senile condition of arcus senilis is present but is limited to the limbal region of the cornea and does not encroach upon the central portion. The anterior and posterior chambers are clear. The edge of the iris is even and smooth. Several very thin opaque areas, are seen in the lens, no doubt the earliest stages of a senile nuclear cataract. The vitreous is clear and shows no opacities. The fundus ground is apparently healthy and even throughout. The disc is sharp and clear. The vessels arise normally and branch. The macular region is normal and the fovea shows no apparent degeneration. The vessels are healthy in appearance but show a slight tortuosity. There is some evidence of venous indentation at the arterial crossing. The ratio of arteries to veins is less than the normal four to five.

THE LEFT EYE

Ophthalmoscopic examination of the left eye shows a small nebula located in the upper temporal side of the cornea. The condition of arcus

senilis as described above is present. The anterior and posterior chambers are again clear and the iris edges are not ragged. The lens of the eye shows no obvious opaque spots as seen in the right eye. The vitreous chamber is clear. The fundus is smooth and of a bright red color. A fine retinal scar is seen in the lower nasal part of the fundus. This is well healed and evidently the result of the blow sustained during the patient's boxing career as a student. The disc is well defined, clear, and there is no sign of elevation. The vessels are the same as the right eye in appearance and the same slight tortuosity exists. The macular region and fovea show no signs of degeneration.

Using an intense source of light the two eyes were transilluminated and each found to be clear.

IV ANALYTICAL EXAMINATION

1. Ophthalmometer

O.D.	45.25 at 175	44.75 at 85
O.S.	45.25 at 15	44.74 at 105

By Javal's Rule Approximate total astigmatism

O.D.	—1.12 axis 85
O.S.	—1.12 axis 105

2. Retinoscopy net

O.D.	+1.50—0.50 axis 85
O.S.	+1.50—0.25 axis 105

3. Astigmatic chart and cross cylinder for net cylinder only

O.D.	—0.75 axis 82
O.S.	—0.50 axis 105

4. Monocular subjective

O.D.	+1.75—0.75 axis 82	V.A. 20/20
O.S.	+1.50—0.50 axis 105	V.A. 20/20

5. Binocular subjective

O.D.	+1.75—0.75 axis 82	V.A. 20/20
O.S.	+1.75—0.50 axis 105	

6. Phoria and ductions six meters
   (a) ½ prism diopter esophoria
   (b) Base-out ductions 8/20/8
   (c) Base-in ductions 9/3

7. Subjective at near
   (a) Unfused cross cylinder
   O.D. +2.00 D.
   O.S. +2.00 D.
   (b) Fused cross cylinder
   O.U. +2.00 D. N.V.A. 20/20

8. Phoria and ductions at 40 centimeters through add.
   (a) Phoria 7 prism diopters exophoria
   (b) Base-out ductions 8/20/8
   (c) Base-in ductions 9/19/3

9. Amplitude of accommodation
   O.D. +0.75 D.
   O.S. +1.00 D.

V ANALYSIS OF THE CLINICAL FINDINGS AND PRESCRIBING

Refractively, this is not a difficult case. The astigmatism is indicated throughout. The ophthalmometer finding is not absolute but is indicatory. The increase in cylinder and spherical power should certainly increase the patient's comfort. In consideration of the patient's complaint and working distances, the final correction is written for trifocals. The intermediate power will be excellent for the distance and the increased segment height will eliminate the necessity of holding the chin up to view the near work.

The phoria and duction values are well balanced. These show no indications that the binocular status would be a source of the asthenopia.

The final prescription was written as

O.D. +1.75—0.75 axis 82 add +2.00 D.
O.S. +1.75—0.50 axis 105 add +2.00 D.
In trifocal form.

VI CONCLUSION

The patient received the new correction one week later. After explanation of the functional principles of the trifocal lenses and instruction in their use, the patient was told to report back in three weeks or sooner. Upon return, the patient reported complete satisfaction, and relief from symptoms.

204 COMMERCIAL NATL. BK. BLDG.
ANNISTON, ALABAMA

CYLINDER RETINOSCOPY FOR AXIS DETERMINATION*

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Cylinder retinoscopy may be regarded as an advanced method of retinoscopy. It is best undertaken after one has learned the principles of retinoscopy and has used the meridional method of neutralizing each meridian with a sphere. The latter method is still much used, both by medical and non-medical refractionists, especially where the clinical facilities for examination are rather poor. The application of cylinders in retinoscopy, although introduced as far back as the nineties of the last century has made but little headway. Even when used, their special significance with reference to locating the axis is but little appreciated. In the following discussion this feature of cylinder retinoscopy will be dealt with in a simple, understandable manner.

There are several ways in which the retinoscope will reveal the presence of astigmia in an eye. The one important for our discussion is the presence of oblique movements. By oblique movements the writer means movements of the reflex (pupillary light and shadow) oblique to the direction of the mirror rotation. In spherical ametropia the reflex movements are always corresponding movements, that is, they follow the directions of the mirror rotation. If the mirror is rotated horizontally on a vertical axis, the reflex movements are in the same plane. If the mirror is rotated in an oblique meridian, say, the 45th (on an axis of 135 degrees), the reflex moves in the same direction, "with" or "against" as the case may be, but along the 45th degree meridian, and so for every other rotation of the mirror. In astigmia, however, the reflex movements are all oblique to the mirror movements except along the two principal meridians. When mirror movements are made along the two principal meridians the reflex movements are corresponding movements. But for all other directions of mirror rotation, the movements are oblique.

The presence of oblique movements then indicates the presence of astigmia. The direction of the principal meridians will be indicated by those directions along which the reflex movements correspond to the mirror movements. But it is generally difficult to locate the principal

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meridians by this sign alone. A better one is to introduce a cylinder as soon as one meridian has been neutralized with a sphere. Say a plus 2.00 sphere neutralizes the horizontal or approximately horizontal meridian, while there is still "with" movement in or near the vertical meridian. The apparent axis of the necessary plus cylinder is approximately horizontal. Suppose a plus 1.00 D. cylinder is now placed witn axis 180 degrees. The accuracy or inaccuracy of this axis is now checked by watching for the presence or absence of oblique movements when mirror rotations are made along the principal meridians of the inserted cylinder, i.e., 90 and 180 degrees.

If the reflex movements are neutral or corresponding, the cylinder axis is correct. The cylinder may be too strong or too weak, but that is a different matter. If, however, the reflex movements are oblique to the mirror rotations made along the principal meridians of the inserted cylinder, then the cylinder axis is wrong. The presence of oblique movements is often made more manifest by the necessity of rotating the mirror *oblique* to the principal meridians of the inserted cylinder in order to fully bring out the reflex movements. Moreover, the oblique movements observed when the cylinder is at the wrong axis are opposite in kind, one is "with," the other "against." This phenomenon is best seen when the sphere is just right so that one meridian is fully neutralized. This newly created astigmia resulting from the cylinder placed at the wrong axis may be termed torsional astigmia.

Having discovered from the presence of the oblique and opposite movements (torsional astigmia) that the plus cylinder at axis 180 degrees is wrongly placed, the next step is to determine the direction in which the cylinder axis has to be turned. This is generally best accomplished by watching the direction of the "with" and "against" *bands*. The direction of the "with band" is in the "myopic" meridian, the one in which the "against" movements take place, while the direction of the "against band" is in the "hyperopic" meridian, the one in which the "with" movement takes place. This seems a bit confusing but will be cleared up by an illustration.

Suppose in a given case the movement of the reflex along the horizontal meridian is "with" and the movement of the reflex along the vertical meridian is "against." The horizontal "with" meridian is then the relatively hyperopic meridian, while the vertical "against meridian" is the relatively myopic. The form of the reflex, however, is generally more or less band shaped. That is, the reflex which moves "with" in the horizontal meridian is in form, more or less, a "vertical band" and

is conveniently called a "with band" as it is a band of light moving "with" the mirror rotations. It is clear then that the direction of the "with band" is along the "myopic" meridian. Similarly, the reflex which moves "against" in the vertical meridian is ir form more or less, "a horizontal band" and is conveniently called an "against band" as it is a band of light moving contrary to mirror rotation. The direction of the "against band" is along the horizontal hyperopic meridian. In other words one must clearly distinguish between the "with" and "against" meridian and the "with" and "against" band. It is frequently easier to note the direction of these bands than the direction of the "with" and "against" movements.

To return now to our original illustration. Suppose with the plus 1.00 axis 180, there were oblique, opposite movements observed, the direction of these movements or rather the direction of the two bands involved in the movements, must be watched for. The plus cylinder is turned in the direction of the "with band." Suppose the "with band" pointed toward 50 degrees, the plus cylinder has to be turned toward 50 degrees, from axis 180 degrees to, say, axis 10 degrees. If this is now the correct axis, there will be no oblique, opposite movements with mirror rotations along the 10 degree and 100 degree meridians. If the cylinder axis is still wrong, oblique, opposite movements will be visible and the cylinder must again be turned toward the direction of the "with band." The observation as to whether the reflex movements are corresponding or oblique requires a keen eye and considerable practice. But this holds true of all refined and advanced methods of examination.

37 WEST 97TH ST.
NEW YORK, NEW YORK

DEFINITION AND MEASUREMENT OF TORSION*

SPECIAL REPORT NO. 2

COMMITTEE ON NOMENCLATURE AND STANDARDS
AMERICAN ACADEMY OF OPTOMETRY

Glenn A. Fry, Chairman
C. L. Treleaven, Rita Walsh, E. L. Higgins and C. A. Radde†

INTRODUCTION

The purpose of this report is to clarify the concept of torsion (or wheel motion) of the eye and to recommend a standard method of defining and measuring it.

ANALYSIS OF EYE MOVEMENTS

The heart of this problem is the selection of a system of axes for analyzing movements of the eye. In accordance with a previous report of this committee[1] which deals with the specification of the direction of regard, it is assumed that the center of rotation is a fixed point within the orbit at which the different positions of the line of sight intersect. It is assumed further in this report that the eye moves around three axes which are interrelated as follows. The line of sight itself is one axis and rotation around it is called torsion.[2] The line of sight is perpendicular to and rotates around a second axis (the azimuthal axis) which is perpendicular to the plane of regard. This rotation produces a change in azimuth, zero azimuth being a direction perpendicular to the base line connecting the centers of rotation of the two eyes. The azimuthal axis rotates around the base line, producing a change in elevation. Zero elevation occurs when the plane of regard is perpendicular to the face plane.

It may be emphasized that the selection of a system of axes for analyzing eye movements is arbitrary, for any number of systems might be used. The system selected by this committee was chosen because of

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1. G. A. Fry, C. L. Treleaven, and R. C. Baxter, Specification of the Direction of Regard, Special Report No. 1 of the Committee on Nomenclature and Standards, Am. J. Optom., 22, 351-360 (1945).

2. Dr. W. B. Lancaster [Terminology in Ocular Motility and Allied Subjects, Am. J. Ophth., 26, 122-132 (1943)] points out a distinction between cycloduction and torsion. Along with Duke-Elder he feels that the word torsion should be restricted

the convenience that it affords in dealing with problems which involve convergence of the lines of sight.

DEFINITIONS

In order to define torsion, it is necessary first of all to define the horizontal meridional plane of the eye. The meridional planes of the eye are fixed with respect to the eye and intersect at the primary line of sight. The horizontal meridional plane is the one which coincides with the plane of regard when the line of sight is straight forward, and the non-fixing eye is occluded and the accommodation is relaxed and the head is held with the base line horizontal and the face plane vertical.

The amount of torsion of the eye (i.e., the amount of rotation of the eye around the line of sight from the zero position) corresponds to the dihedral angle between the horizontal meridian of the eye and the plane of regard. The eye is said to undergo extorsion when the top of the eye turns out, and intorsion when the top turns in. Adtorsion and abtorsion are sometimes used as substitutes for intorsion and extorsion. Levotorsion is one in which the top of the eye moves toward the subject's left, and in dextrotorsion the top of the eye moves to the right. Torsion is called positive when the eye turns the same way as the hands of a watch at which it is looking.

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to (1) the tilting of the vertical and horizontal meridians of the retina which is associated with changes in the direction of fixation, and (2) the "scissor motion" of the retinal image produced by rotating a cylinder before the eye. According to Lancaster the retina itself rotates in the cycloductions but in the torsions the dioptric image does the rotating. This distinction cannot be maintained in connection with this report, because the system of axes which are used for analyzing eye movements makes it necessary to describe the retina as undergoing rotation when the eye changes fixation from the primary direction to some tertiary position. It is proposed, therefore, to use the word torsion in the widest sense possible to include torsion of the eye, torsion of the dioptric image produced by rotating cylinders and spherocylinders, meridional size lenses, Dove prisms, etc., before the eye, and also torsion of the targets, and of tubes or supports holding the targets.

When torsion is used to refer to torsion of the eye, it is intended, as Lancaster intended, to have this apply only to the descriptive geometry of the movement without reference to the pattern of innervation producing it, or its relation to movement of the opposite eye. This abstraction is difficult because one can hardly think of a torsional movement of the eye, without immediately classifying it as being associated with some pattern of innervation.

Four types of torsional eye movements are recognized:

(1) Torsion associated changes in the direction of fixation of one eye when the other is occluded and accommodation is relaxed.

(2) Torsions associated with static and kinetic vestibular stimulation. These are also referred to as cycloversions.

(3) Torsions associated with convergence.

(4) Cyclofusional movements, also called cyclovergences.

The term cycloduction which Lancaster proposes to use for torsion of the eye, deliberately has been avoided in this report, because it is widely used in the optometric profession in a restricted sense to refer to a cyclofusional movement.

FORMULATION OF LISTING'S LAW IN TERMS OF THE RECOMMENDED DEFINITION OF TORSION

Listing's law has been accepted generally as an expression of the relation between changes in direction of fixation and torsion when the non-fixing eye is occluded and accommodation is relaxed. According to the law, the eye in changing from its primary position to a secondary position can be assumed to have moved around an axis perpendicular to a plane containing the primary and secondary positions of the line of sight.

There is only one primary position of the eye. The empirical methods of locating it are described in the various texts. In the normal subject the primary position corresponds closely to the straight forward position.[3 and 4] If it can be assumed that the two actually coincide, the calculation of the changes in torsion associated with changes in the direction of fixation becomes fairly simple.

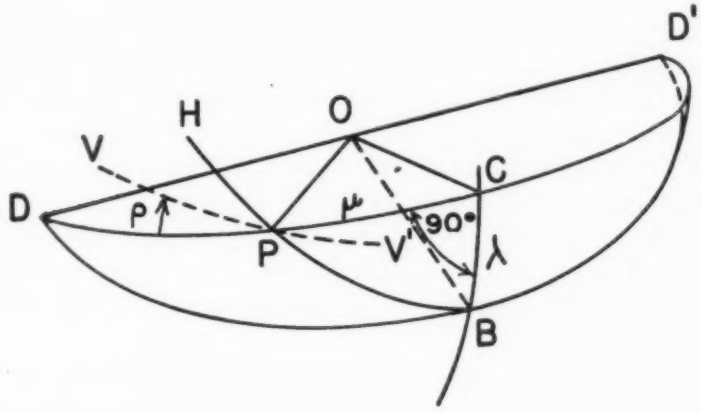

Fig. 1. Torsion associated with changes in the direction of fixation when the primary position of the eye coincides with the straight ahead position.

In Figure 1, O represents the center of rotation of the eye and OB represents both the straight forward and the primary position of the line of sight. DD′ is the base line, and DD′B represents the primary position of the plane of regard. OB is perpendicular to DD′.

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3. M. Tscherning, Physiologic Optics (Translation by Carl Weiland), 348-354 (1924).
4. E. Hering, Spatial Sense and Movements of the Eye (Translation by C. A. Radde), 111-119 (1942).

When the line of sight is directed toward B and accommodation is relaxed and the opposite eye is occluded, and the head is held with the base line horizontal and the face plane vertical, the horizontal meridian of the eye coincides with the primary position of the plane of regard (DBD′). According to Listing's law the eye moves in switching fixation from B to P as if it made a simple rotation around an axis perpendicular to the plane OPB. Accordingly when the line of sight arrives at P, the dihedral angle (∠VPH) between the horizontal meridian of the retina (VV′) and the plane OPB must be equal to the dihedral angle (∠DBP) between the plane OPB and the horizontal meridian of the retina (DBD′) when the line of sight is directed toward B. But when the eye is directed toward P the elevated plane of regard (DPD′) no longer coincides with horizontal meridian of the retina (VV′) but the two planes form a dihedral angle (ρ).

Helmholtz[5] defined this angle as the angle of torsion (Raddrehungswinkel) but von Kries[6] was careful to point out that the word torsion as used here was not to be taken to mean a true "rolling movement" (Rollung) of the eye around its line of sight. According to von Kries, the angle of torsion is merely an angle which has to be used in the description of the *posture* or *position* the eye gets itself into by swinging its line of sight from B to P, and the only *motion* involved is a simple rotation of the eye around an axis perpendicular to the plane OBP.

This committee has sought to circumvent this terminology problem by choosing a system of axes for analyzing eye movements which makes it necessary to define ρ as an actual rotation of the eye, and therefore it is unnecessary to maintain the distinction between "rolling movement" and "torsion."

According to the system of axes which this committee has adopted for analyzing eye movements, the movement of the eye from B to P is accomplished by rotating the eye first around the axis DD′ to bring the line of sight from B to C, and then rotating the eye around an axis perpendicular to the plane OCP.

These two movements would leave the horizontal meridian of the eye coinciding with the plane of regard (DPO), and in order to account for the fact that the eye ends up with an angle (ρ) between the horizontal meridian and the plane of regard, it is necessary to say that the eye actually rotates around its line of sight.

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5. H. von Helmholtz, Physiological Optics (American Edition), 3, 43 (1924).
6. J. von Kries, Note in Helmholtz' Physiological Optics (American Edition), 3, 136-137 (1924).

Since

$$\angle VPH = \angle DBP, \tag{1}$$

$$\rho = \angle DPH - \angle VPH = \angle BPC - (90 - \angle PBC). \tag{2}$$

CBP is a right spherical triangle in which CB represents the elevation (λ) and CP represents the azimuth (μ) and hence

$$\tan \angle BPC = \frac{\tan \lambda}{\sin \mu} \tag{3}$$

and

$$\tan \angle PBC = \frac{\tan \mu}{\sin \lambda}. \tag{4}$$

From equations 2, 3 and 4 the following equation may be derived:

$$\tan \frac{\rho}{2} = \tan \frac{\mu}{2} \cdot \tan \frac{\lambda}{2}$$

Intorsion occurs in the "up and out" and "down and in" quadrants and extorsion occurs in the other two quadrants.

Table I gives the amount of torsion for various values of λ and μ.

TABLE I
TORSION ASSOCIATED WITH CHANGES IN THE DIRECTION OF FIXATION
(The table is based on the assumption that the primary position is the same as the straight ahead position.)

	ELEVATION				
Azimuth	0°	10°	20°	30°	40°
0°	0°	0°	0°	0°	0°
10°	0°	53′	1°46′	2°41′	3°39′
20°	0°	1°46′	3°24′	5°25′	7°21′
30°	0°	2°41′	5°25′	8°13′	11°8′
40°	0°	3°39′	7°21′	11°8′	15°5′

Even when the primary position does not coincide with the straight ahead position, it is still possible to calculate the amount of torsion for various values of λ and μ, provided one knows the deviation of the primary position from the straight ahead position.

In Figure 2, O represents the center of rotation; OA represents the straight forward position of the line of sight; and OB represents the primary position. DD′ is the base line, and the plane ODA represents the primary position of the plane of regard. The dotted line V_1V_1' through B represents the horizontal meridian of the eye when the eye is in the primary position, and the dotted line V_2V_2' represents the hor-

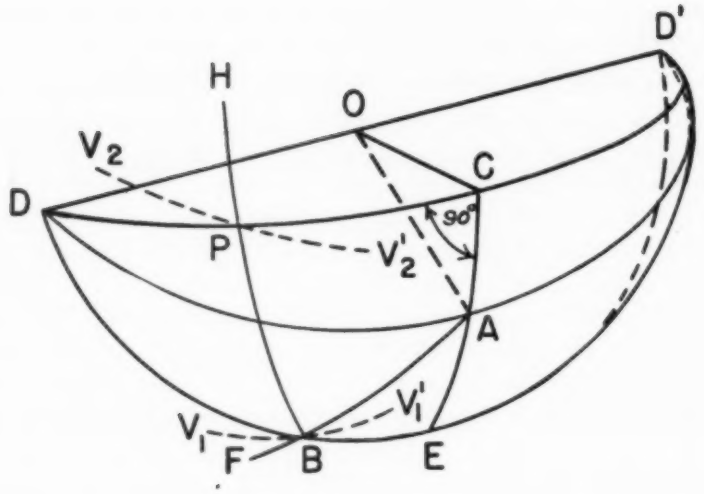

Fig. 2. Torsion associated with changes in the direction of fixation when the primary position of the line of sight fails to coincide with the straight ahead position.

izontal meridian of the eye when the eye is directed toward some other point P.

If we define the torsion of the eye at P as the angle (ρ) between the horizontal meridian of the eye (V_2V_2') and the plane of regard (DPO), the amount of torsion for any point P can be calculated by applying the principles of spherical trigonometry. Since the eye rotates from A to B around an axis perpendicular to the plane OAB, $\langle DAB = \langle V_1BF$, and since the eye moves from B to P around an axis perpendicular to the plane OBP, $\langle V_2PH = \langle V_1BP$. EB and CP represent the azimuth (μ) values for B and P, while AE and AC represent the elevation (λ) values.

The advantage in defining torsion in terms of a system of axes based on the straight forward position of the line of sight (rather than the primary position) is that the data relating to Listing's law have to be reduced to this form for the purpose of comparing them with and using them in analyzing cyclophoria data.

THE VERSATILITY OF THE CHEIROSCOPE IN DIAGNOSIS AND TRAINING*

John E. Wright†
Detroit, Michigan

The device or instrument known as the "cheiroscope" was so named to signify the essential principle of its use, that of "touch and see." The inventor, the late Ernest E. Maddox, is also known for his contribution of several other diagnostic devices such as the Maddox multiple groove, Maddox rod and Maddox double prism.

Essentially, the cheiroscope consists of a device by which the target or fixation object of one eye may be controlled and kept separate from the visual field of the other eye, and in which free and easy access to the field by the hand and arm is available.

Some of the following material is based upon a brochure written by Dr. Carl F. Shepard of Chicago for an optical company which manufactures the Maddox cheiroscope.

According to Dr. Shepard the importance of this principle of hand and eye coordination in a controlled visual field in ocular re-education is appreciated when one considers that (1) during the first three months of life the eyes move independently of each other as demonstrated by the fact that, if one eye is covered it does not follow the excursions of the open eye, (2) convergence does not make its appearance until about the sixth month, and (3) the baby instinctively strives to touch, grasp and explore with the hands every object that attracts its attention. Upon this principle is based our use of the cheiroscope, for when the hand and arm, in fact our whole being, are brought into activity with a visual act, then that visual act is intensified.

Normally, sensations arising from both eyes are associated in the mind with sensations arising from touch, and from kinesthesia, arising from the act of reaching for the objects of regard. In the abnormal cases to be described, sensations arising from only one eye also are associated with sensations of touch and kinesthesia. In either case, whether the individual has single binocular vision or by some misfortune has mon-

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*An abridgment of the material presented before the Michigan Chapter, American Academy of Otpometry. Submitted on May 2, 1947 for publication in the July, 1947 issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

†Optometrist. Fellow, Michigan Chapter. American Academy of Optometry. The author's practice is limited to vision training.

ocular vision, as the individual matures he becomes more and more skilled in the art of adjusting the eyes so as to attain the objective, single vision. Whether the individual attains this single vision, either monocularly or binocularly, depends on the nature of ametropia present and circumstances of visual environment.

When the conditions which originally caused the departure from the normal means of attaining single vision have been corrected as much as possible by ophthalmic lenses or perhaps by surgical interference, it becomes necessary to re-educate the individual in the fine art of ocular adjustment and visual skill. However, in all cases requiring re-education, the patient already has learned the wrong way—seeing with only one eye at a time, or at best, inefficiently.

To teach the individual to see with either eye is not enough. He must be taught to see efficiently with both eyes at the same time. It is logical, therefore, that the most simple and effective way of re-education is to use the methods employed by nature in the original education. That is, to verify visual sensations by tactile sensations. To touch and see, that is the cheiroscope.

The uses of the cheiroscope may be broken down into two phases—diagnosis and training.

Diagnostically, the instrument will disclose, with the proper targets and accessories, the extent and types of the more obvious conditions, such as squints and suppressions.

A permanent record made by the patient's own hand of the extent of the original squint may be obtained in several ways. One very simple method on several types of cheiroscopes is to place a large sheet of paper on the drawing stage, paste a small red dot on one side and have the patient place a pencil mark in the middle of the red dot. Of course, the pencil mark is made by the opposite hand and eye than the fixating eye. This record is kept with the case record or visual training protocol book. From time to time, other drawings are made in the same way and kept for comparison to indicate progress. There are innumerable variations of this method designed primarily to fit the individual case.

The type and extent of suppressions—complete, alternating, peripheral, perimacular and macular—are graphically demonstrated on the cheiroscope. The demonstration is as important to the patient as it is to the doctor in showing what concessions have been made by the individual to satisfy his visual environment. It should be most obvious how the extent or skill of hand and eye coordination can be shown. Jerky, insecure, uncertain motions are the prevalent symptoms of a lack of coordination.

Any interference in the diffuse radiations in the central nervous system blocking or inhibiting any part of the habitual radiation would be expected to reflect in the association existing between hand and eye postures, and therefore, visual interpretations. The instability of drawings or use of pointers is indicative of what the organism is doing to maintain single and clear vision. The importance of hand and eye coordination is shown when we understand the idea that Dr. Samuel Renshaw, Ohio State University, stresses so much in his work, that seeing is a manipulatory thing, that the organism always does something in seeing, that seeing is essentially a matter of addition and subtraction, and that we further understand seeing is not of the eye alone but utilizes the other sense receptors, articular surfaces of joints, kinesthetic appreciation, afferent impulses from muscles themselves and tactile stimuli, as well as previous knowledge and experience.

The entire battery of visual skills is measurable and demonstrable on several types of cheiroscopic devices with the use of appropriate targets and accessories. To minutely describe the technique involved is not necessary here. All of the visual skills which deal with the individual interpretation of the stimuli received by each eye can be developed and improved through cheiroscopic training.

Discrepancies and instabilities in the position of drawings reproduced indicate the postural characteristics of the eyes otherwise known as phorias. Rough indication of duction measurements may be made by using any of the flat split fusion cards, allowing the patient to move the targets either in a base-in or base-out direction until fusion is broken.

Accommodative rock is a training technique easily administered with the use of proper targets and lenses. Other training procedures have been evolved for the treatment of amblyopia, increasing the tolerance for base-in and base-out prisms, and improving fixation and pursuit reflexes. Russell rings and pointers, which are referred to several times in this paper, are a few of the accessories used with the cheiroscope.

Enlarged, dislocated blind spots are easily charted and quickly recharted from time to time to show improvement in the case. There are several phases of vision training in which the condition of the blind spot is considered to be of great diagnostic value by some noted vision training authorities of this country.

In our civilization we have many visual tasks requiring continuous accommodation and convergence which are, as we know, biologically unacceptable tasks. Many occupations require disassociation of right and left eye—jewelers, engravers, watchmakers and users of microscopes

and telescopes, and other occupations such as typing and operating comptometer machines, require disassociation of touch and sight. All of these are causes for a breakdown in the delicate balance between the two essential seeing functions of accommodation and convergence and for a breakdown in the visual skills and efficiency as well. The cheiroscope, of course, will go a long way toward maintaining or regaining the art of efficient seeing.

It is a matter of discussion as to whether home vision training should be instituted. Not considering the pro or con of the question, the cheiroscope may be used at times for home use. If the responsibility of its use at home cannot be placed upon the patient due to age or intelligence, then the cooperation of some adult or other responsible person in the home should be obtained to supervise the performance of the patient. All copies of the work performed should be presented to the practitioner from time to time for correction, observation and further assistance. With reasonable ingenuity the doctor or assistant can devise endless variations of tests and exercises making treatments interesting and effective over an indefinite period.

Among the instruments which lend themselves to cheiroscopic drawing are the stereo-campimeter, correcteyescope, telebinocular, Maddox cheiroscope, and rotoscope with the campimeter stage replacing the target holder and in general, any device provided with stereopsis conditions, septum and drawing stage.

Questions and problems about cheiroscopic drawings will arise, of course, not only from the patient but from the doctor and technician as well. They must be answered or solved on the basis of the evaluation of the problem and patient. The basic technique should be clear and easily understood. Using a simple design before one eye, the projected image is traced before the other eye, a blank sheet of paper being provided for this purpose. The patient is directed to place his pencil point upon some designated portion of the picture and then proceed to follow the outline of the master design until he has completed a replica of it. He must understand that he is to trace, not draw, the object before him. In the event that the patient fails to grasp what is expected of him, he can be shown by a simple demonstration. This may take the form of placing thin tissue paper over a simple line drawing and letting the patient follow the lines with a pencil.

When the reproduced drawing is out of proportion, the only known remedy is to continue practice until the copy assumes the proper size and shape. At the completion of all vision training there should be

no disappearance of pencil, master drawing or the reproduced figure. It is obvious that there should be no loss of awareness of either the pencil or the master copy.

The writer prefers to use yellow scratch paper for reproduction of the drawing. There is good contrast between the black pencil and the yellow background. Because of the large number of tracings made in an active vision training office, an inexpensive paper cutter may be used for making six small drawing papers out of one large sheet of 8½" x 11" yellow scratch paper.

In conclusion, it is not the intention of the writer to depict the cheiroscope as a miracle instrument or as a complete vision training device in itself, but merely to show that with this instrument certain diagnostic and training procedures can be performed satisfactorily and countless variations of those procedures can be made by the doctor and technician to fit the individual case.

412 DAVID BRODERICK TOWER
DETROIT, MICHIGAN

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NOTES ON THE EDUCATIONAL PROGRAM OF THE ACADEMY

Following a successful annual meeting at Philadelphia, members can take stock of the activities now engaged in by the Academy in the sphere of research, and its correlary, the dissemination of technical information dealing with the visual sciences.

This far reaching program of the Academy is an important one to optometry and is planned for the long term advantages which this society can provide for the profession as a whole.

With the many still unanswered questions in physiological optics, physiology, ocular neurology, visual psychology and even in refraction

itself, the work of encouraging research in the field of visual sciences will go on. Most of this research will naturally be done by interested members who are following some program of major interest to themselves, but the results of their work will be given to all optometrists through the Academy and its meetings, and the ultimate publication of their findings in our literature. Some studies will receive Academy grants-in-aid, as in the past, and these, too, will add materially to our general sum of technical knowledge.

Only a part of the work of the Academy deals with research. An important part is the constant presentation of material, in original paper form, dealing with visual and refractive sciences from the purely clinical standpoint. More than half of the papers published in this journal fall in this category. These papers also have an important part to play in general optometric graduate education as they serve as a medium of transition from research work to clinical practice. The meetings of the Academy and its chapters are forums in which this material is presented and discussed before these clinical papers are presented to the profession.

With the coming 1947 annual meeting of the Academy, in December at Chicago, a new technical educational activity will become part of our annual meetings. This new program materially broadens the work of our sections. It will include actual clinical demonstrations by leading specialists in the corrective work of aniseikonia, orthoptics and contact lens fitting. Special lecture and clinical periods will be arranged for each section. This work will serve as a review of basic techniques for specialists and also as a foundation course in the specialty for the optometrist in general practice who does not necessarily wish to specialize but who does wish to keep abreast of the general advanced thinking in the specialty.

And last, our chapters are encouraged to hold frequent meetings at which papers are presented by both members and guests. It is encouraging to note the already large number of these meetings that are being held and the number of guest speakers bringing to optometry the breadth of their views from allied scientific fields.

The research and educational work of the Academy will continue. The program as a whole has the fullest support of the Executive Council. It is backed by Academy resources in no small amount. In its fullest development it will well serve not only the Fellow of the Academy but in addition, all optometrists, as the program is designed to assist the entire profession.

CAREL C. KOCH

ANNOUNCEMENT

DR. ROBERT E. BANNON JOINS JOURNAL STAFF

This month, one of optometry's most capable young men joins the staff of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY as Research Editor—Dr. Robert E. Bannon, Hanover, New Hampshire, who for the past 12 years has been a staff member of the Dartmouth Eye Institute.

DR. ROBERT E. BANNON

Dr. Bannon's decision to accept the position of Research Editor on the Journal was made shortly after he learned the Institute was to close June 30 due to lack of funds with which to continue its 15-year old research program.

Dr. Bannon needs little introduction to most of our readers. His scientific and technical articles have appeared often in this journal and many of our subscribers have heard him lecture at various optometric meetings, including several American Academy of Optometry annual

conventions. He has especially earned himself a reputation as an authority on aniseikonia, a field in which he has specialized ever since his affiliation with Dartmouth Eye Institute.

His work has not been limited to the study of aniseikonia, however. In addition to this specialization, he has conducted research also in the fields of eye movement photography, astigmatism, refraction and orthoptics.

Dr. Bannon was born 37 years ago in Schenectady, New York, and grew up in Glens Falls, New York. After a pre-medical course at Fordham University, he received his optometric degree from Columbia University in 1933, and became associated with Dr. Franklin A. Seward, New York City optometrist, shortly after graduating.

It was through Dr. Harold M. Fisher of New York City that Dr. Bannon became interested in aniseikonia. Dr. Fisher was also an associate of Dr. Seward, and also an iseikonic clinician at the New York Eye and Ear Infirmary.

In October, 1935, Dr. Bannon became affiliated with Dartmouth Eye Institute, where he moved up the ladder of promotion to become assistant professor in applied physiological optics.

Four years after moving to Hanover, Dr. Bannon married the former Frances Cacippo, a Hanover girl. The Bannons have one son, Anthony, age 4½.

In 1939, Dr. Bannon became a Fellow of the American Academy of Optometry and has played a major part in Academy activities ever since, serving as a member of the Executive Council, the aniseikonic section committee and as chairman of the committee on research.

He also is a member of the New Hampshire Optometric Association, the American Optometric Association, the Dartmouth Scientific Association, the New Hampshire Scientific Association, the American Association for the Advancement of Science, and the Optical Society of America.

In addition to his work for the Journal, Dr. Bannon will practice privately in Hanover. This private practice along with his extensive clinical and research experience rounds out his qualifications for an editorial job in this technical journal, and we feel extremely fortunate in having him on our staff. We are confident our subscribers will agree.

As Research Editor, Dr. Bannon will continue to work on the still unsolved problems in the refractive eye field, and share his findings with our readers from time to time. In addition, he not only will review

for Journal readers the thinking of outstanding optometrists throughout the country as revealed by their writings, but also present his own opinions on current problems of optometry.

CAREL C. KOCH

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

A department devoted to announcements, reports, appointments, organization data, news professional problems and ideals, as these relate to the Academy.

NEW MEMBERS OF THE ACADEMY

The following optometrists have been elected to Fellowship in the American Academy of Optometry during the quarter ending June 30, 1947. The Executive Council welcomes these new members.

Dr. Frank A. Blence, 1010 Girard Trust Bldg., Philadelphia, Pa.

Dr. Alvah R. Cooley, Parry Bldg., Langhorne, Pa.

Dr. Henry N. Fisher, 206 Bailey Bldg., 1218 Chestnut St., Philadelphia, Pa.

Dr. John R. Kelly, 326 E. Mitchell St., Petoskey, Mich.

Dr. George H. Kohler, 322 W. Saratoga St., Baltimore, Md.

Dr. J. F. Neill, 1524 Chestnut St., Philadelphia, Pa.

Dr. Donald A. Springer, 204 Commercial Natl. Bk. Bldg., Anniston, Ala.

Dr. George H. Ticknor, 314½ State St., St. Joseph, Mich.

Dr. Robert H. Ticknor, 314½ State St., St. Joseph, Mich.

Dr. Gordon W. Venable, 16 Armat St., Germantown, Philadelphia, Pa.

Dr. Ralph E. Wick, Woolworth Bldg., Rapid City, S. D.

Dr. O. Reynolds Young, 504 Texarkana National Bank Bldg., Texarkana, Texas.

1947 ACADEMY APPOINTMENTS

June has been an exceedingly busy month for Dr. Harold M. Fisher, newly elected president of the Academy. As president, he is charged with the responsibility for appointing the committees which will guide the Academy through the year 1947, and this he reports he

has now done. All committee members have been notified of their appointment by the Academy secretary.

PROGRAM AND PAPERS COMMITTEE

As announced in our June issue, Dr. Harold Simmerman, Woodbury, New Jersey is chairman of the program and papers committee for the December 1947 meeting in Chicago.

Appointed to serve with him are Dr. Julius Nuemueller, Haddonfield, New Jersey; Dr. Henry Hofstetter, Columbus, Ohio; Dr. Eugene Freeman, Chicago, Illinois, and Dr. Arthur R. Neale, Paterson, New Jersey.

This committee has already started work on engaging speakers for the Chicago meeting, with a tentative plan of inviting an outstanding educator to be present at the banquet in addition to the usual optometric program.

REGENTS

Regents of the Academy report directly to the Executive Council. Their duties are:

1. To observe the type and character of practice of members of the Academy in their areas or states and to report any and all infractions of Academy rules to the secretary.

2. To assist in the screening of applicants and in the formation and operation of a local chapter of the Academy in their state.

3. To propose the names of qualified optometrists for Fellowship in the Academy.

4. To secure from the author and submit for publication with his permission, original papers on matters of ocular interest which are presented before local groups. These papers when accepted, will be then published in the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.

Dr. Harold M. Fisher has appointed the following members to serve as regents for 1947.

Alabama

Dr. Donald A. Springer, 204 Commercial Natl. Bk. Bldg., Anniston.

Arizona

Dr. John Jacob Hausman, 46 E. Washington St., Phoenix.

Arkansas

Dr. Hugh A. Pennington, Paragould.

California

Dr. E. C. Deacon, 649 S. Olive St., Los Angeles.
Dr. Kenneth Jaques, 324 Security Bldg., Long Beach.
Dr. Meredith W. Morgan, Jr., 302 LeConte Hall, University of California, Berkeley.

Colorado

Dr. Ernest C. Wille, Jr., 724 Majestic Bldg., Denver.

Connecticut

Dr. Jesse Wheeler, 750 Main Street, Hartford.

Delaware

Dr. Preston E. West, Georgetown.

District of Columbia

Dr. Lewis H. Kraskin, 514 Washington Loan & Trust Building, Washington.

Florida

Dr. R. L. Ryer, 217 Massachusetts Ave., Lakeland.

Idaho

Dr. C. J. Simmons, 205 Salsburg Bldg., Lewiston.

Illinois

Dr. John M. DeMoure, Peoria Life Bldg., Peoria.
Dr. Clifford E. Myers, 310 Rock Island Bank & Trust Bldg., Rock Island.
Dr. Harry E. Pine, 8 South Michigan Boulevard, Chicago.

Indiana

Dr. Roy E. Denny, 704 Odd Fellows Bldg., Indianapolis.
Dr. Clarence W. Morris, 209 Utility Bldg., Fort Wayne.

Iowa

Dr. D. E. Grim, 437 Higley Bldg., Cedar Rapids.

Kansas

Dr. B. B. Sullivan, Union National Bank Bldg., Wichita.

Kentucky

Dr. M. Steinfeld, 609 Broadway, Paducah.

Louisiana

Dr. J. Ottis White, Romain Bldg., Baton Rouge.

Maine

Dr. J. C. Russel, Fidelity Bldg., Brunswick.

Maryland

Dr. Israel Dvorine, 2328 Eutaw Place, Baltimore.

Massachusetts

Dr. J. J. O'Neil, 1383 Main Street, Springfield.

Michigan

Dr. S. M. Harding, 7310 Woodward Avenue, Detroit.
Dr. J. L. Kehoe, 1210 Mott Foundation Bldg., Flint.

Minnesota

Dr. H. C. Sherratt, 428 Kresge Bldg., Minneapolis.

Missouri

Dr. S. Herman Shurin, 901 Chambers Bldg., Kansas City.

Nebraska

Dr. George A. Parkins, Ord.

New Hampshire

Dr. George W. Rand, 32 High Street, Plymouth.

New Jersey

Dr. George L. Brown, Paulsboro.
Dr. Earl H. Ridgeway, 140 West State Street, Trenton.

New York

Dr. B. M. Bohall, 63 West Bridge Street, Oswego.
Dr. John W. Mogey, Bank of Manhattan Bldg., Flushing.

North Carolina

Dr. James O. Baxter, Jr., 508 Front Street, Beaufort.

North Dakota

Dr. J. K. Galloway, Devils Lake.

Ohio

Dr. Charles S. Bridgman, School of Optometry, Ohio State University, Columbus.
Dr. M. H. Kauhl, 419 Guardian Bldg., Cleveland.
Dr. K. S. Rowe, First National Bank Bldg., Fostoria.

Oklahoma

Dr. W. S. Farmer, 718 Hales Bldg., Oklahoma City.

Pennsylvania
Dr. H. Ward Ewalt, Jr., Jenkins Arcade Bldg., Pittsburgh.
Dr. William G. Walton, Jr., 417 Anthwyn Road, Merion.

Rhode Island
Dr. Thomas Costa, 334 Westminster Street, Providence.

South Carolina
Dr. W. C. Ezell, Andrews Building, Spartanburg.

South Dakota
Dr. Ralph E. Wick, Rapid City.

Tennessee
Dr. T. C. Self, 62 Arcade Street, Nashville.

Texas
Dr. Nelson Greeman, Majestic Bldg., San Antonio.

Vermont
Dr. A. B. Jordan, Brattleboro.

Virginia
Dr. William W. Royall, Jr., 133 28th Street, Newport News.

Washington
Dr. H. L. Thomas, Wenatchee Valley Bank Bldg., Wenatchee.

West Virginia
Dr. Wm. Greenspon, Elks Bldg., Bluefield.

Wisconsin
Dr. Russell Z. Franklin, c/o The Sheboygan Clinic, 1001 North 8th Street, Sheboygan.

Canada
Dr. J. Erlanger, Tegler Bldg., Edmonton, Alberta.
Dr. H. A. Nott, 283 Portage Avenue, Winnipeg, Manitoba.
Dr. H. D. Tansley, 127 Main Street, Kenora, Ontario.

England
Mr. Eric Bateman, Bridge House Looe, Cornwall.

ADVISORY COMMITTEE

In accordance with the by-laws and traditional procedure, the immediate past president of the Academy, and a group appointed by the president, shall work with the Executive Council in formulating suggested policies and procedure for the Academy.

The following Academy members have been appointed to serve under Dr. J. Fred Andreae, Baltimore, Maryland, immediate past president: Dr. A. P. Wheelock, Des Moines, Iowa; Dr. Don R. Paine, Topeka, Kansas; Dr. Carel C. Koch, Minneapolis, Minnesota; Dr. Thomas R. Bell, Alpena, Michigan; Dr. George L. Brown, Paulsboro, New Jersey; Dr. C. J. Hathaway, Pontiac, Michigan; Dr. William M. Kinney, Los Angeles, California; Dr. John W. Mogey, New York, New York; Dr. John R. Wittekind, Morrisville, Pennsylvania, and Dr. George W. Keevil, Toronto, Canada.

EXAMINING BOARD

Dr. R. M. Hall, Cleveland, Ohio who has done such splendid work in the past, has been reappointed chairman of the examining board. Dr. Hall is also a past president of the Academy. Members appointed to assist Dr. Hall include the following: Dr. Don R. Paine, Topeka, Kansas; Dr. M. T. Eberl, Milwaukee, Wisconsin; Dr. A. P. Wheelock, Des Moines, Iowa; Dr. E. E. Hotaling, New York, New York, and Dr. Ernest A. Hutchinson, Los Angeles, California.

COMMITTEE ON NOMENCLATURE AND STANDARDS

This committee is charged with the responsibility of making recommendations to the profession for keeping the nomenclature and refractive standards of optometry uniform.

Dr. Glenn A. Fry, Columbus, Ohio has again been appointed chairman. Other members appointed are as follows: Dr. C. L. Treleaven, New York, New York; Dr. C. A. Radde, Cleveland, Ohio; Dr. Rita Walsh, Chicago, Illinois, and Dr. E. L. Higgins, Cleveland, Ohio.

Reports No. 1, and No. 2, have already been published. Report No. 3, by this committee will appear in the near future.

COMMITTEE ON RESEARCH

Dr. Robert E. Bannon, Hanover, New Hampshire has been reappointed to serve as chairman of this committee.

Appointed to help Dr. Bannon in the selection of research projects which will receive financial assistance from the Academy this year, are Dr. Henry A. Imus, Washington, D. C.; Dr. C. L. Treleaven, New York, New York; Dr. Albert Fitch, Philadelphia, Pennsylvania; Dr. Harry L. Fuog, Los Angeles, California, and Dr. Gordon L. Walls, Berkeley, California.

This committee will also consider making recommendations on a graduate scholarship in physiological optics to be financed by the Academy.

SPECIAL POLICY COMMITTEE ON SCREENING TECHNIQUES AND REVIEWING NEW INSTRUMENTS

At the Philadelphia meeting the president was authorized by the Executive Council to create a special committee to study the question of whether the Academy should go into the field of screening techniques and testing new optometric instruments. This committee is to recommend a policy for the future to the council.

The committee is as follows: Dr. V. J. Ellerbrock, Columbus, Ohio, chairman; Dr. E. LeRoy Ryer, New York, New York; Dr. E. L. Higgins, Cleveland, Ohio; Dr. Herbert G. Mote, Columbus, Ohio, and Dr. F. W. Sinn, Philadelphia, Pennsylvania.

CHAPTERS AND NEW CHARTERS COMMITTEE

This year, in addition to its regular duties of serving as a liaison group between the parent body and the local chapter, and helping to organize new chapters, this committee will take on a new assignment. It was the consensus of Academy members at the Philadelphia convention that chapter presidents and secretaries should meet with Academy officers in a special session at the next annual meeting, and this is being arranged under the guidance of this committee for the Chicago meeting.

Dr. Fisher has appointed the following Academy members to serve on this committee: Dr. W. Edward Dewey, Battle Creek, Michigan, chairman; Dr. A. G. Billmeier, Denton, Maryland; Dr. W. I. Brown, New Bedford, Massachusetts; Dr. L. G. Chase, Springfield, Vermont; Dr. O. H. Johnson, Jonesboro, Arkansas; Dr. J. W. Mogey, Flushing, New York; Dr. J. R. Shreve, Indianapolis, Indiana; Dr. W. O. Vivian, Media, Pennsylvania; Dr. R. N. Walker, Winston-Salem, North Carolina; Dr. G. H. Warkentine, Cedar Rapids, Iowa, and Dr. C. H. Wiesepape, Columbia, South Carolina.

EDITORIAL COUNCIL

The appointments to the editorial council as announced by Dr. Harold M. Fisher are as follows: Dr. Carel C. Koch, Minneapolis, Minnesota, chairman; Dr. J. Fred Andreae, Baltimore, Maryland; Dr. Robert E. Bannon, Hanover, New Hampshire; Dr. I. M. Borish, Kokomo, Indiana; Dr. Milton N. Chodroff, Brooklyn, New York; Dr. Harold M. Fisher, Mt. Kisco, New York; Dr. Glenn A. Fry, Columbus, Ohio; Dr. Henry W. Hofstetter, Columbus, Ohio; Dr. D. G. Hummel, Cleveland, Ohio; Dr. E. A. Hutchinson, Los Angeles, California; Dr. E. J. Margaretten, New York, New York; Dr. Meredith W. Morgan,

Jr., Berkeley, California; Dr. Julius Neumueller, Haddonfield, New Jersey; Dr. Carl A. Radde, Cleveland, Ohio; Dr. Harold Simmerman, Woodbury, New Jersey; Dr. C. L. Treleaven, New York, New York, and Dr. Arthur P. Wheelock, Des Moines, Iowa.

Appointments to the three Academy sections, aniseikonia, orthoptics and contact lenses as well as to the special committee to study the formation of an Academy sponsored library and museum will be announced in August.

CURRENT COMMENTS

Virginia Huck
Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department: such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

QUALIFICATION OF SPECIALISTS

A question rapidly demanding an answer both here and abroad is, "should one particular group determine who can or cannot be a specialist in certain forms of optometric work, or should we continue to drift along as at present?"

Many practitioners are already qualified specialists in orthoptics, aniseikonia and contact lens fitting. These doctors became interested in this highly specialized work and took special training to enable them to fulfill the duties which any of these required. Some found that in order to devote sufficient time to the study of these specialties general practice had to be abandoned, and as a result, these practitioners limited their work to their own specialty.

Some men, however, are better trained than others and the question of who should determine whether a practitioner qualifies for the term "specialist" is coming up in optometric circles everywhere.

The question was raised at the recent annual meeting of the American Academy of Optometry and considerable discussion devoted to the subject, but no definite conclusion reached. In England, optometric editors are discussing it, and doubtless it is in the mind of every practitioner who has thought at one time or another of turning to one of the already accepted fields of specialization in optometry.

The public has a right to know who is qualified to be a specialist, and the general practitioner in optometry must know if he is to refer

his patients to specialists with any degree of confidence. In the not too distant future this question must be decided.

What is your opinion? Should authority be delegated to our State Boards of Examiners in Optometry? State laws might be amended to enable our Boards to hold qualifying examinations for optometric specialists. Or, should our professional societies take on the activity of examining and certifying an optometrist's qualifications in a specialty?

An expression of the opinion of our readers would be welcome—either for publication or for perusal by the editor only. The nation-wide thinking of optometric practitioners should become known on this subject so that their views be given proper consideration. The problem can and must be met intelligently and with fairness to all groups.

Address letters to the Editor, American Journal of Optometry and Archives of American Academy of Optometry, 1502 Foshay Tower, Minneapolis 2, Minnesota.

B.V.I. MEMBERSHIP GROWS

Last April we mentioned the Better Vision Institute's current membership campaign. Officials of B.V.I. now tell us three new manufacturers have joined B.V.I. this year, bringing that total to 10, and the number of supply house members has increased from 51 to 67. The number of new professional members is also rising, and the Institute expects to wind up this year with the largest number of professional members in its history.

Which shows optometrists and others in the optometric field do appreciate the fine work being done by this group!

OPTOMETRIC MANUAL BY HOFSTETTER

Word comes from Ohio State University, School of Optometry, this month, that Dr. Henry W. Hofstetter will spend the greater portion of his time this summer writing a textbook on an often neglected phase of optometry.

With the undergraduate optometry student in mind, Dr. Hofstetter will cover the various non-clinical aspects of the practice of optometry, such as jurisprudence, economics, history, professional and interprofessional relationships, educational and organizational problems, practice management, ethics and general civic and sociological problems of visual care.

In corresponding with Dr. Hofstetter he tells us he expects to finish

the book by October, as several chapters are already completed and have been used in his classes.

Judging from a preliminary review of the subjects Dr. Hofstetter plans to discuss, we'll venture to say it will make good reading for more than just undergraduate optometry students.

HOW'S YOUR CLASSIFIED LISTING?

If there has ever been the slightest doubt in your mind as to whether your professional telephone listing is proper and ethical, it will be erased immediately after reading AOA's new bulletin, "Correct Telephone Listing." Correct and incorrect telephone listings are outlined in detail in this four-page pamphlet and we recommend getting a copy for reference in case you haven't received one. The material was made up by A.O.A.'s division of professional standards and a copy may be obtained from Dr. Ernest Kiekenapp, Secretary, A.O.A., 518 Wilmac Building, Minneapolis 2, Minnesota.

GRADUATE TRAINING IN CONTACT LENS FITTING

Dr. William Feinbloom sends word that he and his staff are now conducting day and evening classes in contact lens fitting in several major cities. Although half the tour has already been completed there is still time for optometrists in several cities to contact Dr. Feinbloom for additional information if they so desire. According to the schedule received in this office, representatives of Feinbloom Contact Lenses, Inc., plan to be in Providence, Rhode Island; Minneapolis, Minnesota; Kansas City, Missouri; Memphis, Tennessee; Indianapolis, Indiana; St. Louis, Missouri; Milwaukee, Wisconsin, and Dallas, Texas, during the months of August and September.

A.O.A. AT ATLANTIC CITY

The more than 800 optometrists attending the recent A.O.A. Golden Jubilee convention went on record disapproving recent discriminatory action against optometry by the U. S. Veterans Administration, according to Dr. Ernest Kiekenapp, A.O.A. Secretary.

The first resolution passed by A.O.A. members instructed the Association's Department of National Affairs to "Take any and all steps, including legislation, if necessary, to eliminate discrimination by the Veterans Administration against the profession of optometry and its practitioners."

This is a justified step on the part of the A.O.A. and it is hoped

it will be followed by decisive action to get back into optometry's hands its rightful work.

In a second significant resolution A.O.A. members resolved to continue to strive for closer cooperation between optometry and ophthalmology, as only by complete cooperation can the public receive the best possible visual care.

In all, the delegates passed some 50 resolutions, which coincidentally seems quite appropriate for a 50-year anniversary meeting.

Reports from several New Jersey members tell us that the attendance at the outstanding educational program at Atlantic City was most disappointing. In spite of the large registration of optometrists most speakers had very small audiences. There appears to be no doubt that the ocean and the board walk are strong competition, but the group of speakers were the best in years at an A.O.A. meeting and it is regrettable the attendance was so small.

All present officers of the A.O.A. were re-elected for another term, these being Dr. Edmund F. Richardson, Hollywood, California, President; Dr. John B. O'Shea, Northampton, Massachusetts, Vice President; Dr. J. Ottis White, Baton Rouge, Louisiana, Vice President; Dr. Joseph M. Babcock, Portsmouth, Ohio, Vice President; Dr. Frederick A. Stengel, Marion, Ohio, Treasurer; Dr. William C. Ezell, Spartanburg, South Carolina, Trustee; Dr. John J. Brady, Sheldon, Iowa, Trustee; Dr. Ernest H. Kiekenapp, Minneapolis, Minnesota, Secretary, and Mr. Harold Kohn, New York, New York, Counsel.

It is reported that the 1948 annual convention will be held in San Francisco. The date has not as yet been set, but the meeting will probably coincide with the dedication ceremonies for the new optometry building on the campus of the University of California at Berkeley next June or July.

FREEMAN MONOGRAPH AVAILABLE

"The Optometric Impression Technique in the Fitting of Contact Lenses," a paper co-authored by Dr. Eugene Freeman and Mr. Milton Freeman, Chicago, Illinois, and published in the May issue of this journal, is now available in reprint form.

This monograph (36 pages, plus board covers) may be obtained from Freeman Laboratories, Inc., 116 South Michigan Boulevard, Chicago, for 50 cents.

MAYO MEMORIAL AT MINNESOTA U.

Only $340,000 in private gifts are needed to reach the $3,000,000 total needed to begin construction of the 19-story Mayo Memorial medical building which will serve as a nucleus of a medical center at the University of Minnesota, according to the May 1947 Committee of Founders report.

The memorial building, honoring the memory of Drs. William J. and Charles H. Mayo, will be located on the University campus, and according to most recent plans, will house the University's School of Public Health, the Medical Library and the Cancer Research Institute, (funds to come from other sources) in addition to classrooms, clinical departments and laboratories, etc.

Final details are not available at this time, but present floor plans indicate the ophthalmological work will be located on one of the tower floors (7th to 19th) along with other clinical departments.

REVIEW OF GRADUATION ACTIVITIES

Although some optometry students are being graduated every quarter, the main "cap and gown" day still is in the spring, and now seems the logical time to briefly review the graduation activities of our schools.

This spring, more than 375* students received optometry degrees in the United States and Canada. School officials report this is a sharp increase over the number graduated the last few years but not yet as high as before the war. They estimate that by June, 1948 pre-war figures will be more closely approximated as they expect to confer degrees upon approximately 500 men and women next spring.

The majority of our schools of optometry report they are back on a regular pre-war schedule, after a four or five-year period of operating on an accelerated schedule to accommodate our government during the war.

Los Angeles School of Optometry

Los Angeles reports 63 men and three women were graduated in June. A total of 85 are expected to be ready for state boards next June. The school is no longer operating on an accelerated schedule but is operating on its regular four-year basis.

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*Statements based on information furnished by 10 of the 11 accredited schools of optometry in the United States and Canada. One school did not reply to questionnaire.

Northern Illinois College of Optometry

On April 25, 1947, a class of 70 men and seven women were graduated from Northern Illinois. There will be two more graduating classes by next spring—73 men and five women in September, and 104 men and four women in February, 1948. This college is still operating on the accelerated program, i.e., the four-year course is completed in approximately 32 months, with no vacation periods.

Special awards were given this year to the following students: valedictory award, Almond W. Zellmer, Nekoosa, Wisconsin; award in optometrical science, Ruth K. Katayawa, Guadalupe, California; award in biological science, Charles T. Armstrong, Detroit, Michigan; award in physical science, Emanuel H. Robinson, Asheville, North Carolina.

Pennsylvania State College of Optometry

Forty-four men and five women received degrees at Penn State commencement exercises June 11, 1947, which according to school officials, is approximately one-half the pre-war class. The college reports it expects to graduate 70 students in March, 1948, followed by a September, 1948, graduation of 90 students.

The last fully accelerated class entered Penn State in March, 1947, and will complete work in three years. After this year, each entering class will be admitted in September as usual.

The recipient of the traditional alumni award for the highest four-year scholastic average was Edgar J. Gording, Philadelphia, Pennsylvania. Robert T. Hufford, also of Philadelphia, was awarded the clinical efficiency award of the Department of Optometry. The Albert Fitch award for the best thesis on optometry and public relations was given Stephen J. Polakwich, Saco, Maine.

The Samuel Levitt Memorial award established by the graduating class of October, 1943 in memory of a classmate who died in service, was awarded jointly to Stephen J. Polakwich, and Alfred T. Roshoe, Ashland, Pennsylvania for a thesis on research in optometry.

Massachusetts School of Optometry

The last class to enter Massachusetts School of Optometry during the war was graduated June 8, 1947. There were 19 graduates, none of whom were women. The June 1948 graduating class will number fifty.

The class entering July 28 of this year will be the last one under the accelerated basis, which means the school will return to the regular four-year program in September 1948.

Awards this spring were presented as follows: The faculty award for the highest four-year scholastic average to David I. Yorra; the Joseph J. Scanlon Memorial award for proficiency in clinical work to Bernard S. Potvin; the Lester J. Epstein memorial award for proficiency in theoretical and applied optometry to Arthur Cowan.

School of Optometry, University of California

Approximately one-half the usual number of students were graduated from the School of Optometry at the University of California this spring, the graduating class numbering 25, which included one woman graduate.

The school has not been on an accelerated basis for a year, having returned to its regular four-year course in June, 1946.

School of Optometry, Ohio State University

Thirty men and five women were graduated this spring from the School of Optometry, Ohio State University—a class more than twice the size of the 1946 class.

This year the Epsilon Psi Epsilon merit award for the outstanding junior student was given to Russell D. Howard, Detroit, Michigan.

This school has discontinued its accelerated program and is operating on a five-year program—two years of pre-optometry and three years of optometry.

School of Optometry, Pacific University.

As the School of Optometry at Pacific University was recently reorganized to operate on a five-year basis, no doctor of optometry degrees were conferred in June. One student in optometry received a Bachelors degree, the first step toward a doctor of optometry degree. In August 1947, three doctor's degrees will be conferred as well as an additional four Bachelors degrees.

Southern College of Optometry

On June 18, 1947, forty-three men and one woman received doctor of optometry degrees. Also awarded on graduation night was the degree of doctor of ocular science to Dr. Weston A. Pettey, Lub-

bock, Texas, a past president of the Texas Optometric Association.

The valedictorian of the class was William S. Harper, Jr., of Laurel, Mississippi. Marshall E. Ginsburg, Carthage, North Carolina, was salutatorian.

No indication as to whether the school was operating on a regular or accelerated schedule was received.

School of Optometry, University of Montreal

Doctor of optometry degrees were conferred upon 19 graduates of the School of Optometry, University of Montreal this spring—approximately the same number as a year ago. The school reports it expects to have 23 students graduating in the spring of 1948. They are operating on a regular four-year course basis.

Recipients of special scholarships at this school included Miss Pauline Thibault, S. J. Goldstein, Lionel Cloutier, Avrum Richler, David Singerman and Claude Archambault.

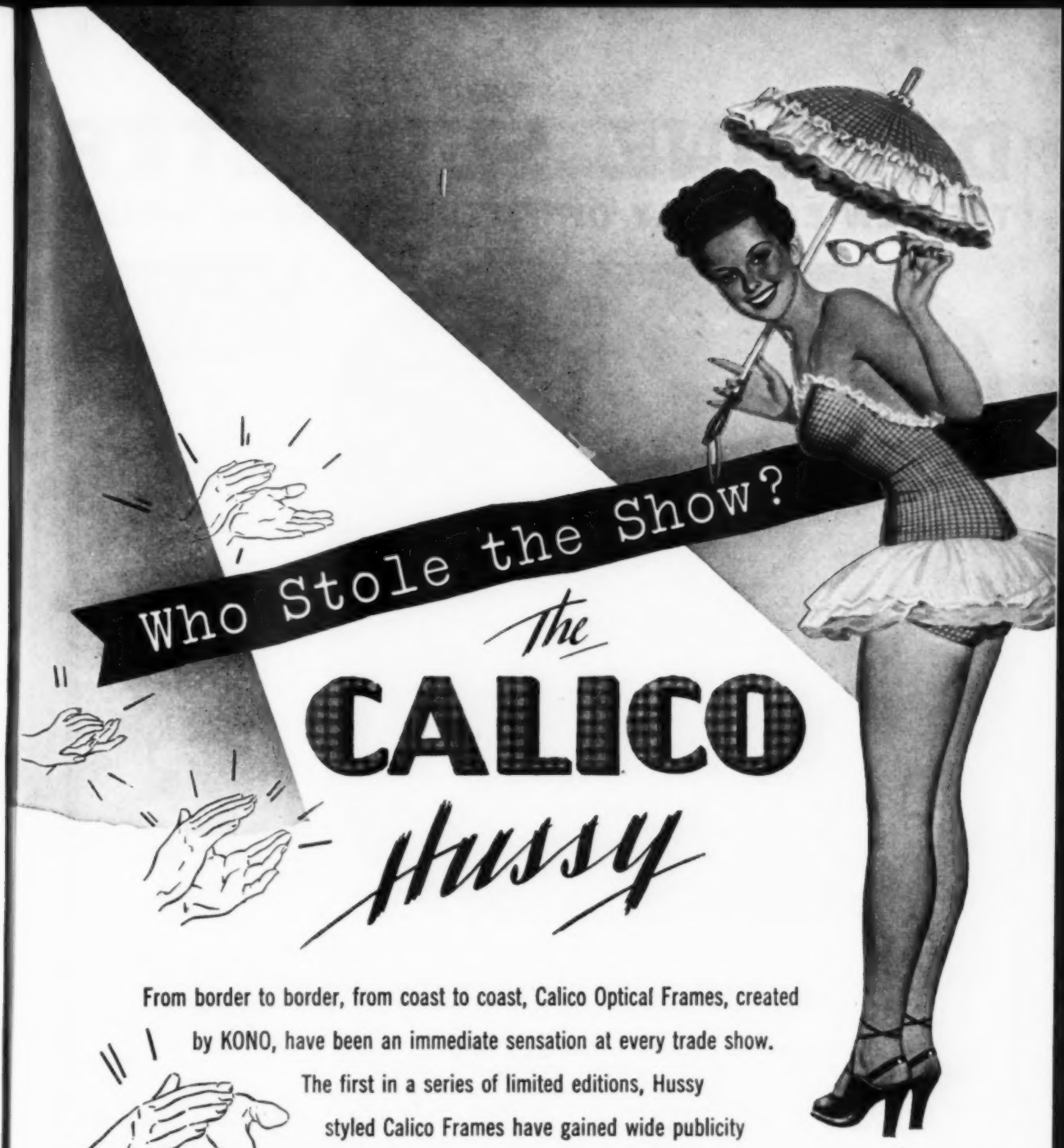
School of Optometry, Columbia University

Slightly more than half the normal prewar number of students were graduated from the Columbia University School of Optometry this spring. Of the 27 graduated, two were women. School officials report the number graduating will climb far beyond pre-war level next spring, with a still greater increase in 1949. The senior class in 1948 at present numbers 65, and there are 84 students in the class of '49.

The accelerated program was used for the first year of the war only, the school returning to its normal four year course after the year's trial.

Two Brooklyn, New York students won this spring's scholarships in optometry at Columbia: Nathan Ephraim of the graduating class and Miss Bertha Jones of the class of '48.

To take care of the increased enrollment, the school is moving this summer into new and larger quarters leased by the University for the School of Optometry.



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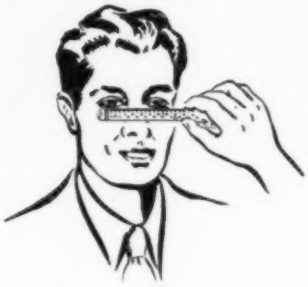

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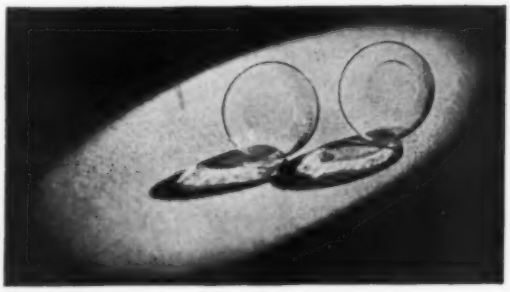

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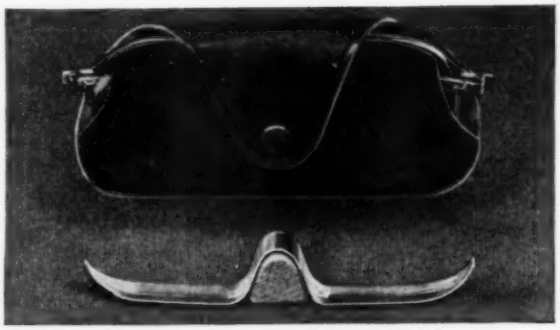

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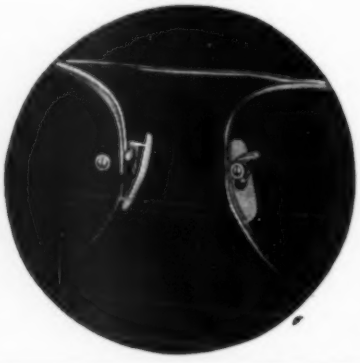

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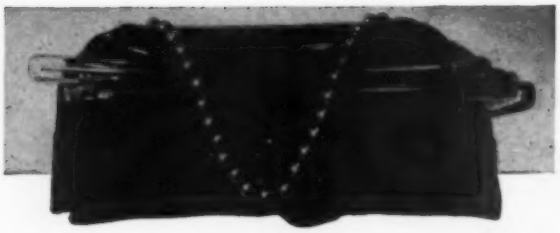

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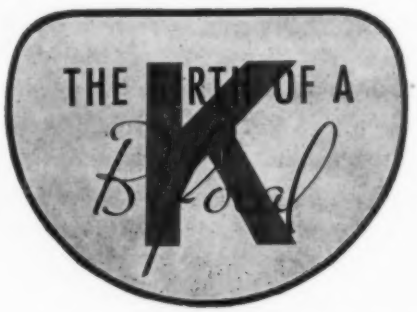
Chicago, Illinois

December 13, 14, 15 & 16, 1947

Reservations accepted after August 20th

To Greater Bifocal Comfort—Clearer Bifocal Vision

THE ONLY FLAT TOP ONE-PIECE BIFOCAL



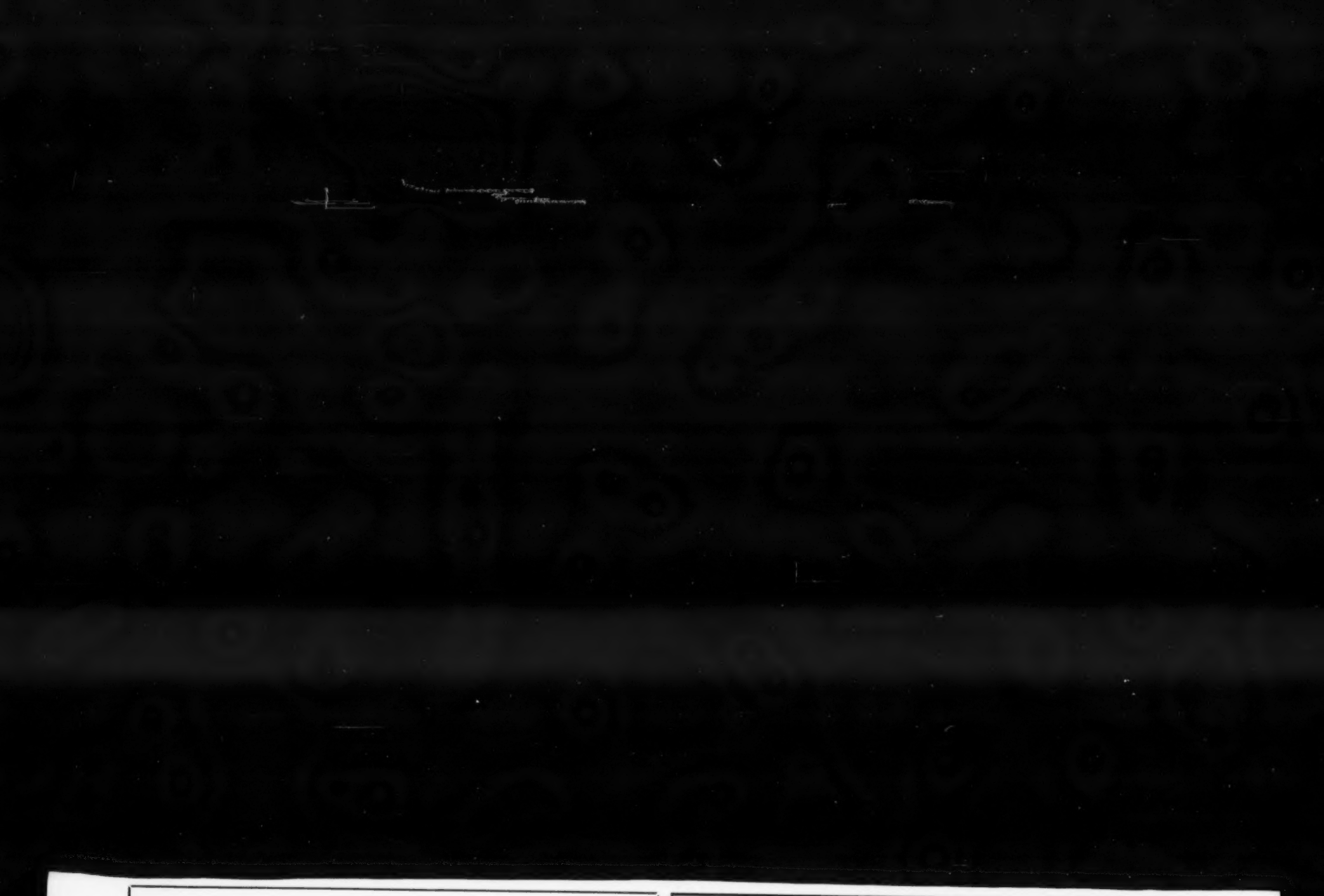
ULTEX K

Every ethical optical man will welcome the availability of K Ultex. Complete base stocks are on hand. A reduction in K consumer prices makes it easier for the doctor to dispense this decidedly superior bifocal.

BEST BY EVERY OPHTHALMIC TEST

1. Sharp, wide angle vision through **both** reading and distance portion.
2. Optically true surfaces, cold pitch polished like finest instrument lenses.
3. Keen definition, no hazy image from injurious fusing processes.
4. Free of color fringes.
5. Thin segment shoulder; no annoying shoulder reflections.
6. Wider reading field, due to **inside** segment.

MINNESOTA OPTICAL COMPANY

Minnesota Optical Company

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